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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/804,187

03/19/2004

Takashi Sato

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EXAMINER

BOLDA, ERIC L

ART UNIT

PAPER NUMBER

3663

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

01/25/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/804,187	SATO ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Eric Boldt	3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3,7-14 and 17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,7-14, 17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on Dec. 19, 2006 has been entered.

### ***Response to Amendment***

2. This Office Action is responsive to Applicant's amendment of Dec. 19, 2006.
3. The objections to claim 16, (and amended claims 1 and 12 where similar claim language appears) are withdrawn. It is noted that the Specification does discuss the change in the number of input wavelengths in reference to automatic gain control.

### ***Response to Arguments***

4. Applicant's argument regarding prior art rejections have been considered but are not persuasive. Applicant argues that Drake does not teach that a distribution ratio of pump light power causes an increased gain near an upper limit where oscillation occurs in the first-stage of the amplifying unit, to thereby obtain a low noise figure. In response, the Examiner notes that the language of the claim merely recites an intended use of the distribution ratio. The backward pumping of the first stage and forward pumping of the second stage of Drake, combined with the two stage optical amplifier of Sulhoff, is capable of performing increasing the gain near the upper limit where

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oscillation occurs in the first-stage and suppressed ASE fluctuation of the output at the second stage when the number of input wavelengths input to the first stage rapidly decreases. The clause "wherein the predetermined distribution ratio.." are essentially statements of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See In re Pearson, 181 USPQ 641; In re Yanush, 177 USPQ 705; In re Finsterwalder, 168 USPQ 530; In re Casey, 512 USPQ 235; In re Otto, 136 USPQ 458; Ex parte Masham, 2 USPQ 2nd 1647.

See MPEP § 2114 which states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from the prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ 2nd 1647

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than functions. In re Danly, 120 USPQ 528, 531.

Apparatus claims cover what a device is not what a device does. Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

5. Applicant further argues that the first stage amplifier is supplied with pumping light in a forward direction in the claims, while Sulhoff discloses that the first stage is supplied with pump light in a backward direction. However, *Drake* teaches in Fig. 1 a two stage optical amplifier with a pump distribution unit (26 and splitter above it) wherein the first stage is pumped at least in a backward direction ( $p_2$ ).

### ***Claim Rejections - 35 USC § 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-3, 6-8, and 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sulhoff as applied to claim 1 above and further in view of Drake (US Pat. No. 6,377,394).

With regard to claims 1, 12, and 13 Sulhoff discloses in Fig. 13 a wavelength division multiplexed (WDM) optical amplifier with

- A first stage (76) optical amplifying unit
- A second stage (78) optical amplifying unit arranged in series with the first stage
- A common control unit (44). The control unit uses the optical signals from the input monitor (32) and output monitor (34) to maintain constant gain (automatic gain control). See 5<sup>th</sup> col. lines 51-63.
- A pumping light distribution function unit ((64) and (84)). The splitter (84) supplies pump light from pump (68) to the first stage optical amplifying unit and second stage amplifying unit.

Sulhoff does not disclose that pumping light distribution unit performs backward pumping on the first stage optical amplifying unit, and forward pumping on the second stage optical amplifying unit. However, Drake teaches in Fig. 1 a two stage optical amplifier with a pump distribution unit (26 and splitter above it) wherein the first stage is pumped at least in a backward direction ( $p_2$ ) and the second stage is pumped in a forward direction ( $p_3$ ). It would have been obvious to one skilled in the art (e. g. an optical engineer) to combine the backward pumping of the first stage and forward

pumping of the second stage of Drake, with the two stage optical amplifier of Sulhoff, for the purpose of reducing amplified spontaneous emission noise.

With regard to claim 2, the pumping light distribution function unit comprises the splitter (84) and pump (68) of Sulhoff.

With regard to claims 1, 8, 12, and 17 it is inherent that the predetermined distribution ratio of the pumps causes suppression of fluctuations of output due to ASE when the number of input wavelengths of the optical signal input rapidly decreases. The limitation "able to change said distribution ratio" is easily met by the reference, since different values other than the exemplary 95% /5% splitting can be chosen. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference.

With regard to claims 3 and 14, Sulhoff discloses in Fig. 11 a wavelength division multiplexed (WDM) optical amplifier with

- A first stage (76) optical amplifying unit
- A second stage (78) optical amplifying unit arranged in series with the first stage
- A common control unit (44). The control unit uses the optical signals from the input monitor (32) and output monitor (34) to maintain constant gain (automatic gain control). The common control unit also supplies pumping light to the first and second stage optical amplifying units with a predetermined distribution ratio.

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- A first pumping light source (68) for pumping the first stage optical amplifying unit
- A second pumping light source (70) for pumping the second stage optical amplifying unit

Sulhoff does not disclose that pumping light distribution unit performs backward pumping on the first stage optical amplifying unit, and forward pumping on the second stage optical amplifying unit. However, Drake teaches in Fig. 1 a two stage optical amplifier with a pump distribution unit (26 and splitter above it) wherein the first stage is pumped at least in a backward direction ( $p_2$ ) and the second stage is pumped in a forward direction ( $p_3$ ). It would have been obvious to one skilled in the art (e. g. an optical engineer) to combine the backward pumping of the first stage and forward pumping of the second stage of Drake, with the two stage optical amplifier of Sulhoff, for the purpose of reducing amplified spontaneous emission noise.

With regard to claim 7, more that two amplifiers in series may be used (Sulhoff, 15<sup>th</sup> col. lines 23-35).

With regard to claims 5, Drake teaches that it is desirable to operate the amplifier with a high pump power input to the first stage to maintain a low noise figure (4<sup>th</sup> col. lines 51-64). Note that the claimed clause "wherein said predetermined distribution ratio causes an increased gain near an upper limit where oscillation occurs in said first-stage optical amplifying unit so as to obtain a low noise figure" is essentially a statement of intended or desired use. Thus, the claim does not serve to patentably distinguish the claimed structure over that of the references.

With regard to claims 10 and 11, the optical amplifying medium forming each optical amplifying unit is a rare earth-doped fiber.

With regard to claim 17, the "means for" language of the claim limitation is being treated under 35 U. S. C. 112, 6<sup>th</sup> paragraph. For the specific structure performing the functional limitations, see Specification, paragraphs [0045]-[0052]. Sulhoff discloses in Fig. 13 a wavelength division multiplexed (WDM) optical amplifier with

- A first stage (76) optical amplifying unit
- A second stage (78) optical amplifying unit arranged in series with the first stage
- A common control unit (44). The control unit uses the optical signals from the input monitor (32) and output monitor (34) to maintain constant gain (automatic gain control). See 5<sup>th</sup> col. lines 51-63. This constitutes means for causing the backward pumping light and forward pumping light to be supplied at a predetermined ratio.
- A pumping light distribution function unit ((64) and (84)). The splitter (84) supplies pump light from pump (68) to the first stage optical amplifying unit and second stage amplifying unit.

Alternatively, Sulhoff discloses in Fig. 11 a wavelength division multiplexed (WDM) optical amplifier with

- A first stage (76) optical amplifying unit



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- A second stage (78) optical amplifying unit arranged in series with the first stage
- A common control unit (44). The control unit uses the optical signals from the input monitor (32) and output monitor (34) to maintain constant gain (automatic gain control). The common control unit also supplies pumping light to the first and second stage optical amplifying units with a predetermined distribution ratio.
- A first pumping light source (68) for pumping the first stage optical amplifying unit (means for supplying the first stage with pumping light)
- A second pumping light source (70) for pumping the second stage optical amplifying unit (means for supplying the second stage with pumping light)

Sulhoff does not disclose means for supplying the first stage optical amplifying unit with backward pumping light, and means for supplying the second stage optical amplifying unit with forward pumping. However, Drake teaches in Fig. 1 a two stage optical amplifier with a pump distribution unit (26 and splitter above it) wherein the first stage is pumped at least in a backward direction ( $p_2$ ) and the second stage is pumped in a forward direction ( $p_3$ ). It would have been obvious to one skilled in the art (e. g. an optical engineer) to combine the backward pumping of the first stage and forward pumping of the second stage of Drake, with the two stage optical amplifier of Sulhoff, for the purpose of reducing amplified spontaneous emission noise.

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sulhoff in view of Drake as applied to claim 8 above and further in view of Ohshima et al. (US

Pat. App. Pub. 2001/0050805). Sulhoff discloses all features of the claim except that the distribution ratio control function unit is an optical attenuator able to change the intensity of the pumping light. However, Ohshima teaches in Fig. 5 an optical amplifier with a single pumping light source (62), and a distribution ratio control function unit comprising an optical splitter (63), and (variable ) optical attenuators (53), (64), and (67), capable of changing the intensity of said pumping light. It would have been obvious to one skilled in the art (e. g. an optical engineer) to combine the variable optical attenuators for the pumps as in Ohshima, with the optical amplifier of Sulhoff, for the purpose of to prevent heat emitted by the pumping light source from adversely affecting the amplification medium. Note that the claimed clause "able to change an intensity..." is essentially a statement of intended or desired use. Thus, the claim does not serve to patentably distinguish the claimed structure over that of the references, since those structures are capable of the intended use.

Note that with regard to claims 1, 12 and 17, the clauses "wherein the predetermined distribution ratio, "performing automatic gain control...", "receiving a control signal..", "causing the backward pumping light..", are essentially statements of intended or desired use. Thus, these claims as well as other statements of intended use do not serve to patentably distinguish the claimed structure over that of the reference. See In re Pearson, 181 USPQ 641; In re Yanush, 177 USPQ 705; In re Finsterwalder, 168 USPQ 530; In re Casey, 512 USPQ 235; In re Otto, 136 USPQ 458; Ex parte Masham, 2 USPQ 2nd 1647. See MPEP § 2114. These statements of

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intended use could be obviated by claim language such as "configured to perform automatic gain control", "configured to receive a control signal", etc.

**Conclusion**

4. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Eric Bolda whose telephone number is 571-272-8104. The examiner can normally be reached on M-F from 8:30am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Jack Keith, can be reached on 571-272-6878. Please note the fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EB

Eric Bolda

JACK KEITH  
SUPERVISORY PATENT EXAMINER